



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,585	03/31/2004	William H. Whitted	16113-1322001	8421

26192 7590 08/14/2008
FISH & RICHARDSON P.C.
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER

PAPE, ZACHARY

ART UNIT	PAPER NUMBER
----------	--------------

2835

MAIL DATE	DELIVERY MODE
-----------	---------------

08/14/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/816,585	Applicant(s) WHITTED, WILLIAM H.	
	Examiner Zachary M. Pape	Art Unit 2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 34-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 34-55 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The following detailed action is in response to the correspondence filed 7/16/2008.

Claim Objections

1. Claims 45-54 are objected to because of the following informalities:

Claim 45 is listed twice. For the purposes of the rejection below, the Examiner has relisted the second claim 45 as claim 46 and has carried this listing through to the last claim.

Appropriate correction is required.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. **Therefore, the fan being matched to a space between adjacent boards as per claims 39 and 51, the valve controller operated by a common control system as the fan control as per claim 40, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.**

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure

number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 39-40, 51 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 39 and 51 recites (either verbatim or with slight variation), “the air circulation fans is matched to a space between adjacent boards” which is new matter

which was not originally presented in the application as originally filed. For the purposes of examination, the limitations will be considered as claimed.

Claim 40 recites, “a valve controller operated by a common control system as the fan controller” which is new matter which was not originally presented in the application as originally filed. Claim 40 details a valve controller, a fan controller, and a control system which controls each. There is no such corresponding description in the written description. Rather, [0036-0037] of the present written description only defines a valve controller and a fan controller which may communicate with each other.

For the purposes of examination, the limitations will be considered as claimed.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 39-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 39 recites, “the air circulation fans is matched to a space between adjacent boards” which is unclear to the Examiner since there is no corresponding drawing or description. For the purposes of examination, the limitation will be considered as per the rejection below.

Claim 40 recites, “a valve controller operated by a common control system as the fan controller” which is unclear to the Examiner since there is no corresponding drawing

or written description. For the purposes of examination, the limitation will be considered as per the rejection below.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 34-36, 38-39, 43-45, 49-50, 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (US 2004/0100770 – hereinafter, "Chu", already of record) in view of Beitelmal et al. (US 2003/0053293 – hereinafter, "Beitelmal", already of record)

With respect to claim 34, Chu teaches (In Figs 2, 3, 5a and 5b) a system for cooling electronic components, comprising: a rack structure (10) holding a plurality of computer boards that support heat-generating computer components (12, [0002-0006], and [0040]), the rack structure having open first and second opposed sides (See Fig 3); a plurality of air circulation fans (Fig 5a element 11) near one of the first or second opposed sides, wherein each of the circulation fans is located near an edge of one of the computer boards and positioned to circulate cooling air across an associated board, wherein the air circulation fans provide substantially all air flow over the boards; one or more cooling coils (21) associated with each of the plurality of boards and located near one of the first or second opposed sides of the rack structure (See Fig 5a). Chu fails to

Art Unit: 2835

teach or suggest a fan controller corresponding to each air circulation fan to control the speed of the corresponding fan according to a temperature sensed around a board corresponding to the air circulation fan. Beitelmal teaches a fan controller (50) corresponding to an air circulation fan (14) to control the speed of the corresponding fan according to a temperature sensed around a board corresponding to the air circulation fan [0031, 0033]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal as per above with that of Chu to provide the ability to increase or decrease the flow rate of cooling fluid [0033]. Increasing or decreasing the fluid rate will allow for more efficient cooling of the electronics.

With respect to claim 35, Chu further teaches that the one or more cooling coils (21) are positioned immediately adjacent to the plurality of circulation fans (11, see Fig 5a).

With respect to claim 36, Chu in view of Beitelmal further teaches (In Fig 11a) a plurality of rack structures, each rack structure having associated air fans (11), cooling coils (21), and fan controllers (As per the teachings of Beitelmal), and wherein the rack structures are arranged to form a pair of rows on each side of a central aisle (Space between racks shown in Fig 11a), with the cooling coils (21) located on sides of the rack structures away from the aisle and near outside walls of a container (Case including 81 which surrounds the racks) that houses the plurality of rack structures (See Figs 11a).

With respect to claim 38, Chu in view of Beitelmal teach the limitations of claim 34 as per above however the embodiment disclosed in Fig 5a of Chu fails to specifically

Art Unit: 2835

teach or suggest a separate cooling coil for each computer in a rack of computers.

However, the embodiment disclosed in Fig 8a of Chu clearly discloses the limitations of claim 38. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of the embodiment in Fig 8a with the embodiment of Fig 5a of Chu since if a particular drawer to be pulled or removed from the electronics frame only the corresponding heat exchanger associated with that drawer need to be repositioned [0045].

With respect to claim 39, Chu in view of Beitelmal teach the limitations of claim 38 as per above and further teaches that the air circulation fans (11) are matched to a space between adjacent boards (See Fig 5b where the top of the fan (11) is matched with the bottom of the space between successive 13's) but fails to specifically teach or suggest that the boards are mounted horizontally on shelves of the rack structure as claimed. The Examiner hereby takes Official Notice of the conventionality of mounting boards with or without containers (12/13 as per Chu) on shelves within a rack structure. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings as per the Official Notice above with that of Chu and Beitelmal since shelving provides support and structural integrity to the rack of Chu.

With respect to claim 43, Chu teaches (In Figs 5a and 11a) a system for cooling electronic components, comprising: first and second rows of computer racks (10) arranged on each side of a central aisle (See Fig 11a), each rack including: a frame structure (10) defining a plurality of spaces and an open front and back sides (See Fig 3), wherein the open front side of each rack is adjacent the aisle (See Fig 11a); a

Art Unit: 2835

plurality of computer boards (12, within 13) holding computing components and mounted in the frame structure (See Fig 5a); a plurality of fans (11), each associated with a computer board (within 13) and a temperature sensor near the computer board [0052]; one or more cooling coils (21) arranged to cool substantially all of the air from the plurality of fans. Chu fails to teach or suggest a plurality of fan controllers corresponding to the plurality of fans and programmed to control the speed of each fan according at least to a temperature sensed by each fan's associated temperature sensor. Beitelmal teaches a plurality of fan controllers (50) corresponding to a plurality of fans (14) and programmed to control the speed of each fan according to a temperature sensed by a respectively temperature sensor [0031, 0033]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal with that of Chu to provide the ability to increase or decrease the flow rate of cooling fluid [0033]. Increasing or decreasing the fluid rate will allow for more efficient cooling of the electronics.

With respect to claim 44, Chu further teaches that the open back side of each frame structure is adjacent an exterior wall (That which is connected to 81 as per Fig 11a) of a container that holds the rows of computer racks and the one or more cooling coils(21) located between the open back side and the exterior wall of the container (See Fig 11a).

With respect to claim 45, Chu further teaches that the racks (10) extend substantially the length of the container (See Fig 11b).

With respect to method claims 49-50, 52 the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu and Beitelmal references as per the rejections above.

6. Claims 37, 46, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal and further in view of Rumbut, Jr. (US 5,740,018 – hereinafter, “Rumbut”)

With respect to claims 37 and 46, Chu in view of Beitelmal teach the limitations of claims 36 and 43 as per above but fails to teach or suggest the limitations of claims 37 or 46. Rumbut teaches a cooling module (250) outside of a container (200) which fluidly connects to cooling coils. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Rumbut as per above with that of Chu to provide a device which will remove heat from the fluid and thus allow the heat to be moved from the rack structure to an external area.

With respect to method claim 51, the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu, Beitelmal, and Rumbut references as per the rejection above.

7. Claims 41 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal and further in view of Laffranchi (US 3,889,746).

With respect to claims 41 and 47, Chu in view of Beitelmal teach the limitations of claims 34 and 43 as per above but fails to teach or suggest the limitations of claims 41

Art Unit: 2835

or 47. Laffranchi, however, teaches one or more cooling coils include coolant conduits having an external member and an inner baffle defining an annular channel therebetween and through which a cooling liquid flows (See, Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Laffranchi with that of Chu and Beitelmal to provide for a smooth continuation of flow in the pipe line (Col 1, Line 67 – Col 2, Line 1).

8. Claims 42, 48 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal and further in view of Etter (US 6,407,567).

With respect to claims 42 and 48, Chu in view of Beitelmal teach the limitations of claims 34 and 43 as per above but fails to teach or suggest the limitations of claims 42 and 48. Etter, however, teaches individually controlling fans to provide the appropriate air flow rate for an individual heat generating device (Col 3, Lines 28-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Etter with that of Chu and Beitelmal to provide for a more efficient cooling apparatus (I.E. having fans provide only enough airflow that is necessary reduces power consumption).

With respect to method claims 55, the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu, Beitelmal and Etter references as per the rejection above.

9. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal and further in view of Takahashi et al. (US 6,530,347 - hereinafter, "Takahashi").

With respect to claim 53, Chu in view of Beitelmal teach the limitations of claim 48 as per the rejection above and Beitelmal further teaches the conventionality of having a valve (42) which controls a fluid flow. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal as per above with that of Chu to provide for a means to control the fluid flow through the coils of Chu.

With respect to the remaining limitations of claim 53, Chu in view of Beitelmal fail to teach or suggest the remaining limitations. Takahashi, however, teaches modulating a cooling liquid to the cooling coils though a valve; and controlling the valve according to at least one of a temperature and a pressure of the cooling fluid (Col 8, Lines 18-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Takahashi with that of Chu and Beitelmal to prevent damage to the electrical components by assuring that there is enough coolant at the proper temperature to provide adequate cooling (Takahashi, Col 1, Lines 30-33).

10. Claim 54 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu in view of Beitelmal in view of Takahashi and further in view of Laffranchi.

With respect to claim 54, Chu, Beitelmal and Takahashi all teach the limitations of claim 52 as per above but fail to teach the limitations of claim 54. Laffranchi teaches

the limitations of claim 53 as per the rejection to claims 41 and 46. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Laffranchi with that of Chu, Beitelmal, and Takahashi to provide for a smooth continuation of flow in the pipe line (Col 1, Line 67 – Col 2, Line 1).

Response to Arguments

11. Applicant's arguments filed 7/16/2008 have been fully considered but they are not persuasive.

With respect to the Applicant's remarks to claim 34 that, "Chu '770 does not have open first and second opposed sides", the Examiner respectfully disagrees and directs the Applicant to the rejection to claim 34 above.

With respect to the Applicant's remarks to claim 34 regarding the Beitelmal reference, the Examiner notes that Beitelmal is merely being used to teach the fan controller and its function (See the rejection to claim 34 above).

With respect to the Applicant's remarks to claim 36 that, "Chu '770 does not disclose or suggest providing such a central aisle in its cabinet", the Examiner disagrees and directs the Applicant to the rejection to claim 36 above. Further the Examiner notes that claim 36 requires that the rack structures are arranged to form a central aisle, not that a central aisle is created in a cabinet as alleged in the present remarks.

With respect to the Applicant's remarks to claim 40, the Examiner notes that the Examiner believes there are substantial 112 issues with claim 40 and has not provided

an art rejection thereto. However, the Examiner does agree that neither Chu '770 nor Beitelmal teach or suggest the limitations of claim 40 as presently recited.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary M. Pape whose telephone number is 571-272-2201. The examiner can normally be reached on Mon.- Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash Gandhi can be reached on 571-272-3740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/816,585

Page 14

Art Unit: 2835

/Z. M. P./

Examiner, Art Unit 2835

/Jayprakash N Gandhi/

Supervisory Patent Examiner, Art Unit 2835